

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of the species of Figs 1-5, readable on claims 1-7, 9-17, 19, 33-40, 42-46, 101, and 102, in the reply filed on Feb 25, 2008, is acknowledged. Note that applicant canceled claims 8, 18, 20, and 41 in the provided amendment.
2. Claims 21-32, and 47-100 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on Feb 25, 2008.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-7, 9-17, and 19, are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi et al. (6,256,555) in view of either Kurokawa (US Pub No. 2003/0102682) or Mori et al. (5,191,218).

Bacchi et al discloses an end effector for handling semiconductor wafers comprising: a base member (10) having proximal end and distal end, the base member having a top surface; a plurality of support members (24,26) located on the top surface of the base member, the plurality of support members being configured to contact a wafer received on the top surface; a pushing device for positioning a wafer on the base member, the pushing device comprising a retractable piston (52 or 150) configured to contact an edge of the a semiconductor wafer, the piston being moveable between an extended position and a retracted position; a biasing member (155) placed in association with the piston,

the biasing member biasing the piston towards its extended position; and a vacuum pressure actuator (151) in operative association with the piston. Bacchi et al. (6,256,555) does not teach a suction device positioned adjacent the actuator to create a suction force. However, Kurokawa (US Pub No. 2003/0102682) teaches a wafer chuck (Figs. 4 and 5) having suction devices to create suction forces. Mori et al. (5,191,218) also teaches a wafer chuck (1) having apertures (3, 3,) to create suction forces. Thus, it would have been obvious to those skilled in the art to provide a suction force to be positioned adjacent the actuator of Bacchi et al. (6,256,555) as taught by Kurokawa (US Pub No. 2003/0102682) or Mori et al. (5,191,218) to provide a suction force in order to suck the undesired items or a wafer itself.

Re claims 2,4,5, the modified Bacchi et al. discloses a contact element (50) having a flat surface positioned at the end of the piston for contacting a semiconductor wafer; wherein the piston is maintained in a bearing assembly (154) positioned downstream from the actuator (fig. 11), the bearing assembly preventing particles generated during the movement of the piston from contacting a semiconductor wafer held on the base member (bore 154 is sealed with airtight seals 158); the biasing member comprises a spring (155).

Re claim 7, Mori et al. (5,191,218) teaches a gas line (Fig. 2B) to control the gas or fluid flow with a valve (7).

Re claim 10, Bacchi et al. discloses the pushing device is positioned at the proximal end of the base member.

Re claims 11 and 12, Bacchi et al. does not disclose the height of the end effector.

Bacchi et al. does not disclose the end effector is adapted for retrieving and replacing wafers from closely spaced apart wafer cassettes (14) and is so shaped to be slender enough

to fit between close spaced wafers (col. 10, lines 8-19). It would have been obvious to one of ordinary skill in the art at the time of the invention to design the end effector according to dimensions for passing between closely space wafer cassettes.

Re claims 13,14,16,17, and 19, Bacchi et al. discloses at least one backstop member (34) located on the base member generally opposite the pushing device, wherein the backstop member has a height sufficient for a wafer to be held in between the backstop member and the piston when the piston is at least partially extended (figs 3,4,8); the base member includes a first tine (188) spaced from a second tine (190), the first and second tines terminating at the distal end of the base member, each of the tines including at least one backstop member (134); the biasing member and the pneumatic actuator are contained in a housing (airtight bore 154) defined by the base member (fig 8); at least certain of the support members (arcuate rest pads 124,126) comprise a surface configured to only contact an edge of a semiconductor wafer, the surface having a convex and eccentric shape (Fig 9); a wafer detection system (214) comprising a light sending pathway (244) positioned opposite a light receiving pathway (240) across the base member, the light sending pathway being configured to emit a light beam towards the light receiver pathway, and wherein the wafer detection system is configured to detect the presence of a wafer when the light beam is intersected by the wafer (fig 14); a pair of backstop members (134) are positioned at the end. of each tine, each pair of backstop members surrounding a corresponding support member (124), each backstop, member having a height greater than the height of the corresponding support member (figs 3 and 4).

5. Claims 33-40, 42-46, 101, and 102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi et al. (6,256,555) in view of Siniaguine et al. (6,095,582).

Bacchi et al discloses a pushing device located at the proximal end of the base member, the pushing device comprising a retractable piston (52) configured to contact an edge of a semiconductor wafer for positioning the wafer on the base member; plurality of support members (24,26) are shaped to only contact the edge of the wafer; the support members comprise a surface configured to only contact an edge of the semiconductor wafer, the surface having convex and eccentrical shape (fig. 2,4, and 9); the base member includes a first tine (188) spaced from a second tine (190) in a forked arrangement, the first and second tines terminating at the distal end of the base member, the support members having convex and eccentrical surface being positioned at the distal end of each tines; further comprising backstop members (134) surrounding the support members located on the first tine and the second tine at the distal end of the base member, the backstop members having a height greater than the support members (see fig. 3 and 4); a wafer detection system (214) comprising a light sending pathway (244) positioned opposite a light receiving pathway (240) across the base member, the light sending pathway being configured to emit a light beam towards the light receiver pathway, and wherein the wafer detection system is configured to detect the presence of a wafer when the light beam is intersected by the wafer (fig 14).

Note that Bacchi et al. (6,256,555) does not show a pair of pins to support a wafer. However, Siniaguine et al. (6,095,582) teaches a pair of high pins (160, 160) and another pair of lower pins (140, 140) to support a wafer. Thus, it would have been obvious to those skilled in the semiconductor art to provide a pair of pins on the wafer

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blade of Bacchi et al. (6,256,555) as taught by Siniaguine et al. (6,095,582) to minimize the contamination. It is pointed out that applicant recites "a pair of emergency pins" having a height lower than the support member. However, to those skilled in the semiconductor art would provide a safety support, either by providing a sensor or a pin shorter than the support members, or a pin higher than the support members to safely grip a wafer. Moreover, Siniaguine et al. (6,095,582) also teaches a compressed gas (Fig. 1) to provide gas. Thus, it would have been obvious to those skilled in the semiconductor art to provide a gas line with a source on the Bacchi et al. (6,256,555) as taught by Siniaguine et al. to support a wafer. Also note that a vacuum source could be provided instead of a compressed air, which is well known in the semiconductor art to absorb debris or the undesired items.

Response to Arguments

6. Applicant's arguments with respect to claims 1-7, 9-17, 19, 33-40, 42-46, 101, and 102 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
8. Graf et al. (7,004,716) shows a wafer chuck having a plurality of pins.
9. Casarotti et al. (6,688,662) shows a wafer blade with a plurality of pins.
10. Correnti et al. (4,566,726) shows a wafer support having a plurality of pins.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL T. CHIN whose telephone number is (571)272-6922. The examiner can normally be reached on MON-THURS (7:30 -6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saul Rodriguez can be reached on (571) 272-7097. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PAUL T. CHIN/
Examiner, Art Unit 3652